

Ser.no. 10/656,948
Amendment dated April 25, 2005
In Reply to Office Action dated February 25, 2005

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

CLAIMS

1.(Original) An automotive exhaust flange assembly for attaching exhaust pipes, said assembly comprising:

a first flange, made of powder metallurgically produced material, comprising a mating surface and a pipe attachment surface opposite said mating surface; and

a second flange, made of powder metallurgically produced material, comprising a sealing surface complementary to said mating surface of said first flange and a pipe attachment surface opposite said sealing surface;

wherein said first flange or said second flange further comprises gasket retention means through mechanical interference to provide squeeze areas.

2.(Original) The flange assembly of claim 1 wherein the gasket retention means is an oval annular recess.

3.(Original) The flange assembly of claim 1 wherein the gasket retention means is a notched annular recess.

4.(Withdrawn) The flange assembly of claim 1 wherein said first flange further comprises a set of ribs within said pipe attachment surface for reducing the weight of said first flange.

5.(Withdrawn) The flange assembly of claim 1 wherein said second flange further comprises a set of ribs within said pipe attachment surface for reducing the weight of said second flange.

6.(Withdrawn) An automotive exhaust flange assembly for attaching exhaust pipes, said assembly comprising:

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a first flange, made of powder metallurgically produced material, comprising a mating surface and a pipe attachment surface opposite said mating surface; and

a second flange, made of powder metallurgically produced material, comprising a sealing surface complementary to said mating surface of said first flange and a pipe attachment surface opposite said sealing surface;

wherein one of said first or second flange further comprises at least one concave recess for accepting fastening means to secure said first and second flanges when mated.

7.(Withdrawn) The flange assembly of claim 6 wherein said at least one concave recess comprises a hexagonal portion at one end.

8.(Withdrawn) The flange assembly of claim 6 wherein said fastening means comprises a hexagonal shoulder.

9.(Withdrawn) An automotive exhaust flange assembly for attaching exhaust pipes, said assembly comprising:

a first flange, made of powder metallurgically produced material, comprising a first surface having a cavity and a pipe attachment surface opposite said first surface; and

a second flange, made of powder metallurgically produced material, comprising a sealing surface complementary to said cavity and a pipe attachment surface opposite said sealing surface;

said second flange further comprises at least one integral stud for securing said second flange to said first flange when said flanges are mated.

10.(Withdrawn) An automotive exhaust flange assembly for attaching exhaust pipes, said assembly comprising:

a first flange, made of powder metallurgically produced material, comprising a mating surface and a pipe attachment surface opposite said mating surface; and

a second flange, made of powder metallurgically produced material, comprising a sealing surface complementary to said mating surface of said first flange and a pipe attachment surface opposite said sealing surface;

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said first flange further comprising a hat-shaped annular recess for receiving a hat-shaped gasket.

11.(Withdrawn) The flange assembly of Claim 10 wherein said second flange further comprises a protrusion corresponding to said hat-shaped annular recess of said first flange.

12.(Withdrawn) An automotive exhaust flange assembly for attaching exhaust pipes, said assembly comprising:

a first flange, made of powder metallurgically produced material, comprising a mating surface and a pipe attachment surface opposite said mating surface; and

a second flange, made of powder metallurgically produced material, comprising a sealing surface complementary to said mating surface of said first flange and a pipe attachment surface opposite said sealing surface;

said first flange comprising an v-shaped annular rib;

said second flange further comprising a v-shaped annular recess for receiving said annular rib.

13.(Withdrawn) The flange assembly of claim 12 wherein said first flange further comprises a pipe attachment means arranged on said pipe attachment surface of said first flange.

14.(Withdrawn) The flange assembly of claim 12 wherein said second flange further comprises a pipe attachment means arranged on said pipe attachment surface of said second flange.

15.(Withdrawn) An angled exhaust flange assembly comprising:

an exhaust pipe having a first and a second end;

a flange securable to an end of the pipe;

the first end of the pipe being angled a pre-determined amount away from the second end of the pipe so that an angled flange assembly is provided when the flange is fastened to the first end.

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16.(Withdrawn) The angled exhaust flange assembly as recited in claim 15, wherein the pre-determined amount is substantially 135 degrees.

17.(Withdrawn) The angled exhaust flange assembly as recited in claim 15, wherein a second flange is fastened to the second end of the pipe.

18.(Withdrawn) The angled exhaust flange assembly as recited in claim 15, wherein the flange is a spherical flange.

19.(Withdrawn) The exhaust flange assembly as recited in claim 17, wherein the second flange is a spherical flange.

20.(Withdrawn) An angled exhaust flange assembly comprising:
an exhaust pipe having a first and a second end;
a flange;
an angled portion, having a first end connected to the flange and a second end connected to the first end of the exhaust pipe for providing an angled exhaust flange assembly.

21.(Withdrawn) An exhaust flange assembly for sealingly connecting exhaust pipes to each other, said assembly comprising:
a female flange having a mating surface and a pipe attachment surface; and
a male flange having a mating surface and a pipe attachment surface;
where spacers are arranged on said pipe attachment surface of either said female flange or said male flange to provide a pre-determined minimum clearance between said pipe attachment surface and fastening means;
said spacers being integrally formed when the flange is manufactured via a powder metallurgy process.

22.(Withdrawn) The exhaust flange assembly as recited in claim 21, wherein the spacers are separately formed and bonded to the flange during a sintering operation.

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- 23.(Original) A method of manufacturing an exhaust flange comprising the steps of:
manufacturing a back plate via a stamping process;
manufacturing a sealing part via a powder metallurgy process;
pre-sintering the sealing part;
sintering the back plate and the sealing part; and
assembling the back plate and the sealing part to form the exhaust flange.
- 24.(Original) A method of manufacturing an exhaust flange comprising the steps of:
manufacturing a back plate via a stamping process;
manufacturing a sealing part via a powder metallurgy process;
sintering the sealing part;
assembling the back plate and the sealing part; and
welding the back plate to the sealing part to form the exhaust flange.
- 25.(Original) A method of manufacturing an exhaust flange comprising the steps of:
manufacturing a back plate via a powder metallurgy process;
manufacturing a sealing part via a powder metallurgy process;
separately pre-sintering the backing plate and the sealing part;
assembling the back plate and the sealing part; and
sintering the back plate and the sealing part to form the exhaust flange.
- 26.(Original) A method of manufacturing an exhaust flange comprising the steps of:
manufacturing a back plate via a powder metallurgy process;
manufacturing a sealing part via a powder metallurgy process; and
sintering the back plate and the sealing part to form the exhaust flange.
27. (Original) An automotive exhaust flange assembly for attaching exhaust pipes, said assembly comprising:
a curved flange, made of powder metallurgically produced material; and
a straight flange, made of powder metallurgically produced material,

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wherein when said curved and straight flanges are mated and secured by fastening means, said curved flange deflects towards to for a flat sealing surface between said curved and straight flanges.

28.(Withdrawn) A flange for use in a flange assembly comprising:
a sealing surface for mating with a sealing surface of a second flange and a pipe attachment surface;
said sealing surface comprising at least one raised area for reducing deflection of said flange when said flange is mated; and
a set of mounting holes for receiving fastening means securing mating of flange to said second flange.

29.(Withdrawn) A flange for use in a flange assembly comprising:
a sealing part comprising a cavity for receiving a complementary surface of a second flange; and
a back plate having a recess, in a first surface, for receiving and housing said sealing part and a second surface providing a pipe attachment surface.

30.(Withdrawn) The flange assembly of Claim 1 wherein said first flange comprises 0.75 to 1 weight percent of hexagonal boron nitrate.

31.(Withdrawn) The flange assembly of Claim 1 wherein said second flange comprises 0.75 to 1 weight of hexagonal boron nitrate.